

# Smallpox

## Risk

- Declared eradicated worldwide in 1980.
- Two repositories hold the variola virus: VECTOR in Koltsovo, Novosibirsk, Russia, and the CDC in Atlanta, Georgia, USA.
- Potential agent of bioterrorism.
- Vaccinations are not administered to the general public.
  - In 2007, ACAM2000, the newest version of vaccine made of vaccinia virus, became part of the USA stockpile of smallpox vaccines.

## Perioperative Risks

- Hemodynamic compromise from dehydration and/or sepsis

## Worry About

- Facility and provider contamination

## Overview

- Virus enters respiratory tract, migrates into pulmonary lymph nodes, and spreads into the bloodstream.

- Incubation period is 7–17 d; at this point, not contagious.
- Prodromal phase is 2–3 d. Abrupt, severe headache, backache, and fever; possibly contagious.
- Rash develops, increases, and lasts for weeks; this is contagious:
  - Mucous membrane enanthemas, then skin lesions.
  - Centrifugal spread.
  - Starts on extremities and spreads to trunk.
  - Deep-seated, firm, round pustules, leading to rupture and necrosis, leading to scabs.
  - Lesions all in same stage of development.
- Contagious until resolution of scabs.
- Approximate 30% mortality; death primarily from sepsis.
- Must be distinguished from chicken pox (varicella):
  - No prodrome.
  - Lesions centripetal spread.
  - Start on trunk.
  - Superficial vesicles.
  - Lesions in different stages.

## Etiology

- Caused by *Orthopoxvirus variola*
- Human vector only
- Transmission via prolonged, inhalational contact with infected bodily fluid or contaminated material

## Usual Treatment

- No direct treatment.
- Early stage: Vaccination
- All stages: Supportive (hydration, nutrition).
- Treat secondary infections.
- Prevent further viral contraction: Use respiratory and contact precautions, pt isolation, negative pressure room, and quarantine exposed persons.

## Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Oral/mucosal enanthemas Rash Corneal ulceration (rare)	Centrifugal lesion spread Ocular pain	Pox lesions: Vesicular or pustular	CBC, differential, virus titer, PCR Ophthalmology exam
RESP	Respiratory viral infection Bacterial pneumonia	Often asymptomatic		Virus titer Sputum smear for Guarnieri bodies CXR, CBC
CV	None			
GI	Occasionally abdominal pain and/or diarrhea with prodrome			
CNS	Constitutional symptoms Encephalitis	Sudden onset, severe headache, backache, malaise	Temp >38.1° C Delirious	CBC, differential
HEME	Disseminated intravascular hemolysis	Mucosal bleeding	Epistaxis, gastrointestinal bleeding, hemoptysis, subconjunctival and/or gum bleeding	CBC, peripheral smear, D-dimer, PT, aPTT, fibrinogen
METAB	Dehydration Malnutrition	Poor oral intake	Dry mucus membranes, tenting skin, subcutaneous fluid accumulation, massive skin desquamation	Electrolytes, Ca <sup>2+</sup> , Mg <sup>2+</sup> , albumin, prealbumin

**Key References:** Breman JG, Henderson DA: Diagnosis and management of smallpox, *N Engl J Med* 346(17):1300–1308, 2002; Schumacher J, Runte J, Brinker A, et al.: Respiratory protection during high-fidelity simulated resuscitation of casualties contaminated with chemical warfare agents, *Anaesthesia* 63(6):593–598, 2008; Neligan P: Smallpox. In Fleisher LA, editor: *Anesthesia and uncommon disease*, ed 6, Philadelphia, PA, 2012, Saunders, pp 392–393.

## Perioperative Implications

### Preoperative Preparation

- Anesthesiologists would be among the first responders to those affected by a biologic terrorist attack.
- Pt resuscitation and any airway management would need to be administered with special attention to provider respiratory protection, including contact precautions and wearing a N95 mask.
- Vaccinate providers as indicated by CDC guidelines.

### Monitoring

- Consider arterial line or CVP catheter as indicated.

### Airway

- Caution with provider exposure to airway secretions
- Gentle manipulation of airway if friable oral lesions are present

### Preinduction/Induction

- Pt likely to be extremely dehydrated; hydrate before induction and/or gentle induction.

### Maintenance

- Manage as appropriate for surgical procedure.
- Adequate hydration; continue TPN if being nutritionally supported.
- Dispose of all used materials in appropriate biohazard containers.

### Extubation

- Avoid excessive coughing to minimize viral particulate spread.

### Postoperative Period

- Continue medical support.
- Diligence in washing hands and returning of soiled scrubs by personnel.

## Anticipated Problems/Concerns

- Strict infection control needs to be continued.
- Follow CDC recommendations if provider exposed.

# Spasmodic Torticollis

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## Risk

- Estimated prevalence of 9 cases per 100,000.
- ST, also known as cervical dystonia, is the most common form of focal dystonia.
- Peak incidence is in the fifth decade.

- Two times more common in females.
- 80% of cases are sporadic or primary.
- 20% of cases are secondary to an underlying brain lesion or trauma.

## Perioperative Risks

- Dysphagia
- Aspiration
- Consider comorbid neurologic problems such as seizures, cranial nerve palsies, hemiplegia, and so forth.

**Worry About**

- Difficult pt positioning secondary to sustained muscle contractions
- Difficult intubation as a result of poor extension of the cervical spine and diminished mouth opening

**Overview**

- ST is defined as twisting of the neck caused by involuntary muscle contractions.
- Idiopathic ST is a slowly progressive disease that manifests between the third and fifth decades. Idiopathic ST is likely caused by abn of the basal ganglia circuitry.
- Dystonia typically progresses over 3–5 y before it plateaus.
- Pain occurs in 75% of pts and contributes to disease disability.
- If ST occurs acutely, it is necessary to rule out causes related to trauma, medications (metoclopramide,

halldol, phenothiazines), intracranial abnormalities (tumors, AVMs, hemorrhages), and neck pathology (retropharyngeal abscess).

- The sternocleidomastoid and trapezius muscles are most commonly involved, but extracervical dystonia may occur in 20% of pts.
- Jerking of the head and head tremors are common features.
- Head positioning determines the type of torticollis:
  - Rotational torticollis: Rotation of the head around the long axis of the neck.
  - Anterocollis: Head tilts forward with neck flexion.
  - Retrocollis: Head tilts backward with neck extension.
  - Laterocollis: Head tilts to one side with the ear pulled toward the shoulder.

**Etiology**

- A genetic component probably contributes to the development of ST since it is a familial pattern.

- Trauma, medications, and intracranial pathology can cause focal dystonic reactions such as torticollis.

**Usual Treatment**

- Chemical denervation with botulinum toxin is the mainstay of therapy. Botulinum toxin is injected into overactive muscles in the neck that are responsible for the dystonia. It usually takes a week to take effect and lasts up to 3 mo before a repeat injection must be given.
- Pharmacologic therapy with anticholinergics, benzodiazepines, Parkinson medications, and baclofen are used as adjuncts to botulinum toxin.
- Surgical options include mechanical denervation of affected muscles, deep brain stimulation, and intrathecal baclofen if spasticity is prominent.

**Assessment Points**

System	Effect	Assessment by Hx	PE
HEENT	Head deviation	Twisting, pulling sensation	Hypertrophic SCM and trapezius
RESP	Restrictive lung disease	Dyspnea	
GI	GERD	Food regurgitation; pain after meals	
CNS	Diplopia Difficulty with transfers Aspiration risk	Vision deficits Coughing with food Use of walker, cane, wheelchair	Abnormal eye movements. facial droop, depressed gag, tremor, spasticity of muscles, weakness

**Key References:** Mac TB, Girard F, McKenty S, et al.: A difficult airway is not more prevalent in patients suffering from spasmodic torticollis: a case series, *Can J Anaesth* 51(3):250–253, 2004; Patel S, Martino D: Cervical dystonia: from pathophysiology to pharmacotherapy, *Behav Neurol* 26(4):275–282, 2013.

**Perioperative Implications**

**Preinduction/Induction/Maintenance**

- Routine considerations.
- Consider the use of nondepolarizing muscle relaxants.
- NMB may have no effect on muscle contractures, which are permanently shortened muscles that result from structural muscle changes.
- Anticipate the use of fiberoptic intubation.

**Preoperative Considerations**

- Consider preop injections of Botox at least 1 wk prior to anesthesia.

- It is imperative to evaluate the range of cervical spine extension, maximal mouth opening, and integrity of the temporomandibular joint.

**Monitoring**

- Routine

**General Anesthesia**

- Propofol is likely to be safe with all dystonias.
- GA with thiopental, succinylcholine, atracurium, isoflurane, and fentanyl is thought to be safe in spasmodic torticollis.

**Regional Anesthesia**

- Limited reports but thought to be safe
- Postop period
- Risk of aspiration

**Anticipated Problems/Concerns**

- Anticipate difficult intubation secondary to fixed head turning from muscle contractures that do not respond to muscle relaxants.
- Be aware of cervical spine pathology that may result from prolonged torticollis.
- Neurologic conditions such as cranial nerve dysfunction and seizure disorders may accompany secondary ST caused by an underlying intracranial lesion.
- ST can cause head tremors, which should not be confused with hyperkinetic movement disorders.

**Spinal Cord Injury**

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**Risk**

- In USA, trauma is the number one cause.
- Approx 10,000–12,000 cases per y.
- Males (80%) primarily affected.
- Motor vehicle collisions, falls, violence (GSW), sports-related injuries, hematoma, and transverse myelitis most common.

**Perioperative Risks**

- Hypotension, particularly in acute injury resulting in neurogenic shock and concurrent hypovolemia
- Autonomic instability, which may result in severe cardiopulmonary compromise.

**Worry About**

- Autonomic dysreflexia (T6 or above, but as low as T12 in some; usually seen 1–6 mo after injury)
- Hypoventilation leading to acute respiratory compromise and chronic infections
- Irregular thermoregulation

**Overview**

- Injury to the spinal cord at level of the cervical or thoracic vertebrae resulting in loss of underlying sympathetic stimulation, unopposed vagal tone, and sensory and motor deficits.
- Cervical spine and thoracolumbar junction (T11–L2) most susceptible to injury.
- Lower lumbar regions also susceptible to injury, although they do not usually result in neurologic injury.
- Neurologic injuries rare from sacral or coccygeal fractures.
- Acute (<3 wk): Neurogenic shock, urinary/fecal retention, vagal predominance, and hyperesthesia.
- Chronic (>6 mo) injury: Hyperreflexia and spasticity.
- Upregulation of Ach receptors from immobilization results in increased resistance to NDMBs and increased potassium release with succinylcholine.

**Etiology**

- Direct mechanical injury usually from traumatic insult leading to hemorrhage, edema, and ultimately spinal cord ischemia.
- Release of inflammatory mediators and membrane-destabilizing enzymes leading to disruption of electrophysiologic pathways and tissue degeneration.
- Complete lesions result in total loss of sensory and motor function below level of injury.
- Incomplete lesions result in maintenance of some function below primary level of injury and some degree of recovery.
- Above T1 = quadriplegia, below T2 = paraplegia, usually.